

In the Claims:

1. (Original) A process for the hydroformylation of an optionally substituted ethylenically unsaturated compound by reaction thereof with carbon monoxide and hydrogen in the presence of a catalyst system comprising:

- (a) a source of Group VIII metal cations;
- (b) a diphosphine ligand having the general formula (I):



wherein X^1 and X^2 each independently represent an optionally substituted cyclic group with at least 5 ring atoms, of which one is a phosphorus atom, and R represents a bivalent optionally substituted bridging group which is connected to each phosphorus atom by a sp^2 hybridized carbon atom;

(c) an acid having a $pK_a < 3$, measured in an aqueous solution at 18 °C, or a salt derived therefrom; and

(d) a source of halide anions.

2. (Original) The process of claim 1 wherein R is selected from the group consisting of alkene, cycloalkene, and aromatic groups, wherein the carbon atoms connected to a phosphorus atom are connected via an unsaturated bond to another atom.

3. (Original) The process of claim 1 wherein R is a bivalent optionally substituted aromatic bridging group with both phosphorus atoms bound to the same sp^2 hybridized carbon atom.

4. (Original) The process of claim 1 wherein R is a bivalent optionally substituted aromatic bridging group having at least 2 sp^2 hybridized carbon atoms and each phosphorus atom is connected to a separate sp^2 hybridized carbon atom.

5. (Original) The process of claim 1 wherein the bridge in R contains 2 to 6 carbon atoms.

6. (Original) The process of claim 5 wherein the bridge in R contains 2 to 4 carbon atoms.

7. (Currently Amended) The process of claim [[6]]1 wherein the bridge in R contains at least 2 sp^2 hybridized carbon atoms.

8. (Original) The process of claim 1 wherein X^1 and/or X^2 represent an optionally substituted phospho-bicycloalkyl group with at least 6 ring atoms.

9. (Original) The process of claim 1 wherein X^1 and X^2 have 6 to 12 ring atoms.

10. (Original) The process of claim 1 wherein the diphosphine ligand (b) is selected from the group consisting of

1,2-P,P'bis(9-phosphabicyclononyl) benzene;

1,2-P,P'bis(9-phosphabicyclononyl) 4-methyl benzene;

3,4-P,P'bis(9-phosphabicyclononyl) thiophene;

1,2-P,P'bis(9-phosphabicyclononyl) cyclopentene; and

1,2-P,P'bis(9-phosphabicyclononyl) cyclohexene.

11. (Original) The process of claim 10 wherein the diphosphine ligand (b) is selected from the group consisting of

3,4-P,P'bis(9-phosphabicyclononyl) thiophene; and

1,2-P,P'bis(9-phosphabicyclononyl) cyclopentene.

12. (Currently Amended) The process of claim 1 wherein the source of Group VIII metal cations is selected from the group consisting of sources of rhodium, nickel, palladium, and platinum cations.

13. (Currently Amended) The process of claim 12 wherein the source of Group VIII metal cations is selected from the group consisting of sources of palladium, and platinum cations.

14. (Currently Amended) The process of claim 13 wherein the source of Group VIII metal cations is a source of palladium cations.

15. (Original) The process of claim 1 wherein the source of Group VIII metal cations is selected from the group consisting of Pd (II) acetate and Pt (II) acetylacetonate.

16. (Original) The process of claim 1 wherein the ethylenically unsaturated compound has 2 to 40 carbon atoms per molecule.

17. (Currently Amended) The process of claim 16 wherein the ethylenically unsaturated compound is an alkene comprising ~~at least~~ 4 to 40 carbon atoms.

18. (Currently Amended) The process of claim 17 wherein the ethylenically unsaturated compound is an alkene comprising ~~at least~~ 8 to 40 carbon atoms.

19. (Original) The process of claim 18 wherein the ethylenically unsaturated compound is an alkene comprising 8 to 25 carbon atoms.

20. (Original) The process of claim 19 wherein the alkenes are octenes in a mixture of octenes, octadienes, methyl-heptadienes, and/or dimethyl hexadienes.

Claims 21-26 (Canceled).

Please add the following new claims:

27. (New) The process of claim 1 wherein R represents a bivalent cycloalkene group.

28. (New) The process of claim 1 wherein R represents a bivalent aromatic group wherein the aromatic ring contains one or more hetero atoms as a ring atom.

29. (New) A process for the hydroformylation of an optionally substituted ethylenically unsaturated compound by reaction thereof with carbon monoxide and hydrogen in the presence of a catalyst system comprising:

- (a) a source of Group VIII metal cations;
- (b) a diphosphine ligand having the general formula (I):



wherein X^1 and X^2 each independently represent an optionally substituted cyclic group with at least 5 ring atoms, of which one is a phosphorus atom, and R represents a bivalent optionally substituted bridging group having at least two sp^2 hybridized carbon atoms and each phosphorus atom is connected to a separate sp^2 hybridized carbon atom;

- (c) an acid having a $pK_a < 3$, measured in an aqueous solution at 18 °C, or a salt derived therefrom; and
- (d) a source of halide anions.

30. (New) A process for the hydroformylation of an optionally substituted ethylenically unsaturated compound by reaction thereof with carbon monoxide and hydrogen in the presence of a catalyst system comprising:

- (a) a source of Group VIII metal cations;
- (b) a diphosphine ligand having the general formula (I):



wherein X^1 and X^2 each independently represent an optionally substituted cyclic group with at least 5 ring atoms, of which one is a phosphorus atom, and R represents a bivalent optionally substituted bridging group which is connected to each phosphorus atom by a sp^2 hybridized carbon atom and wherein the bridge in R contains 2 to 4 carbon atoms;

- (c) an acid having a $pK_a < 3$, measured in an aqueous solution at 18 °C, or a salt derived therefrom; and
- (d) a source of halide anions.

31. (New) A process for the hydroformylation of an optionally substituted ethylenically unsaturated compound by reaction thereof with carbon monoxide and hydrogen in the presence of a catalyst system comprising:

- (a) a source of Group VIII metal cations;
- (b) a diphosphine ligand having the general formula (I):



wherein X^1 and X^2 each independently represent an optionally substituted cyclic group with at least 6 ring atoms, of which one is a phosphorus atom, and R represents a bivalent optionally substituted bridging group which is connected to each phosphorus atom by a sp^2 hybridized carbon atom;

- (c) an acid having a $pK_a < 3$, measured in an aqueous solution at 18 °C, or a salt derived therefrom; and
- (d) a source of halide anions.